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ERADICATING TUBERCULOSIS

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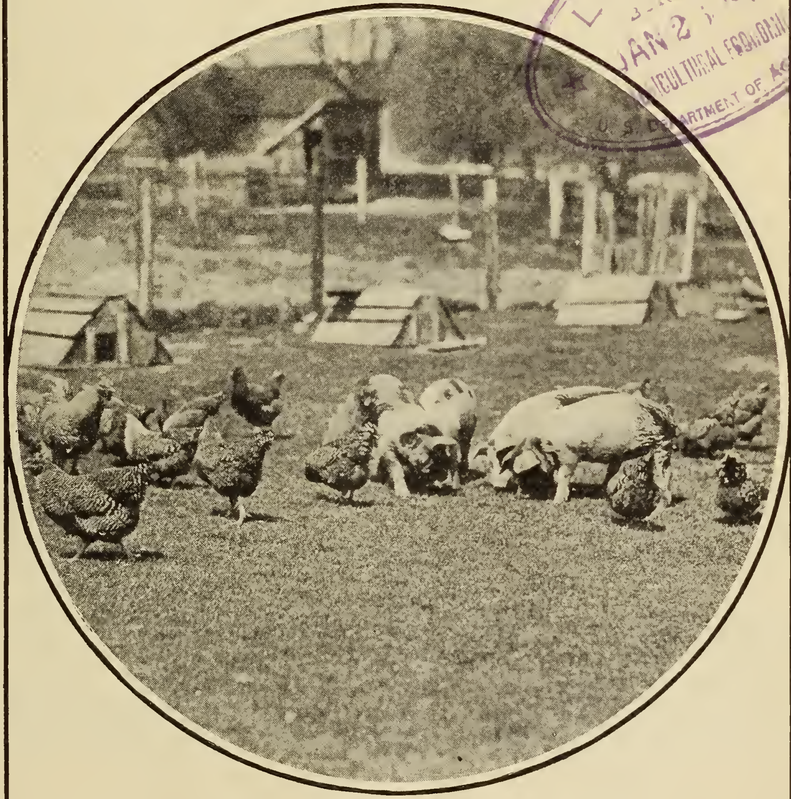

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ERADICATING TUBERCULOSIS FROM POULTRY AND SWINE

By Elmer Lash, *veterinarian, Tuberculosis Eradication Division, Bureau of Animal Industry*

The type of tuberculosis which affects poultry, and is readily transmitted to swine, is of frequent occurrence in the Central and North Central States and apparently has been spreading to other areas in recent years (fig. 1). Contrary to the common opinion, this infection, known as avian tuberculosis, is not due to climatic conditions but to the manner of handling poultry and hogs. The disease exists on 80 percent of the farms in some counties and is a serious menace to the poultry industry in at least 600 counties in the Middle West. In some counties as high as 15 percent of the swine are infected with avian tuberculosis.

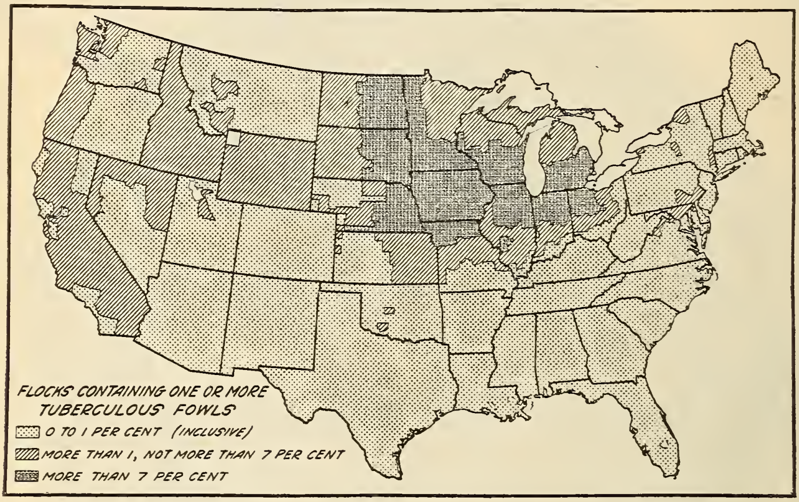
FLOCKS CONTAINING ONE OR MORE TUBERCULOUS FOWLS
0 TO 1 PER CENT (INCLUSIVE)
MORE THAN 1, NOT MORE THAN 7 PER CENT
MORE THAN 7 PER CENT

Figure 1.—Approximate extent of avian tuberculosis in the United States.

This type of tuberculosis is caused by a germ so minute that it can be detected only with the aid of a high-power microscope after the germ has been prepared by a special staining process. The germs appear as beaded rods both singly and in clusters, as shown in figure 2.

The same type of germ causes tuberculosis in chickens, ducks, geese, turkeys, pheasants, parrots, pigeons, canaries, sparrows, and many other members of the feathered tribes. Swine, rabbits, rats, and mice are also susceptible. Birds can be infected artificially with the types of tuberculosis germs that affect cattle and man, but with the exception of parrots and canaries, birds are strongly resistant to such infection transmitted in a natural way. Cattle and human beings are seldom affected with avian tuberculosis.

How the Disease May Be Spread

The germs of tuberculosis do not normally multiply outside the body. They can live for a long time, however, in the soil and in filth (fig. 3). Infected droppings may contaminate the feed and water of healthy fowls and thereby spread the disease. Houses and runways occupied by diseased poultry may be a serious menace to healthy fowls for a year or more after the diseased birds have been removed, unless the premises are cleaned and disinfected. The disease may be spread to healthy poultry or swine when such animals eat carcasses of tuberculous fowls, rats, or mice. Feeding the viscera of tuberculous market fowls to poultry or swine is a means of spreading the disease, sometimes to distant points. Such offal should be burned or else buried deeply.

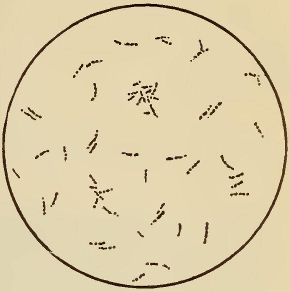

FIGURE 2.—Germs of tuberculosis, avian type, as they appear under the microscope. (Greatly enlarged.)

The disease is spread from flock to flock largely by the introduction of infected breeding stock that may appear to be in perfect health In purchasing new breeding stock, hatching eggs, or baby chicks it is a good plan to buy only from flocks that are known to be free of tuberculosis. The germs may also be carried on the shoes of attendants, or on feed sacks from premises where the disease exists. It is doubtful whether the disease is spread to any extent on the feet of small birds, such as the English sparrow. The pigeon, however, is susceptible to this type of infection and may serve as a carrier.

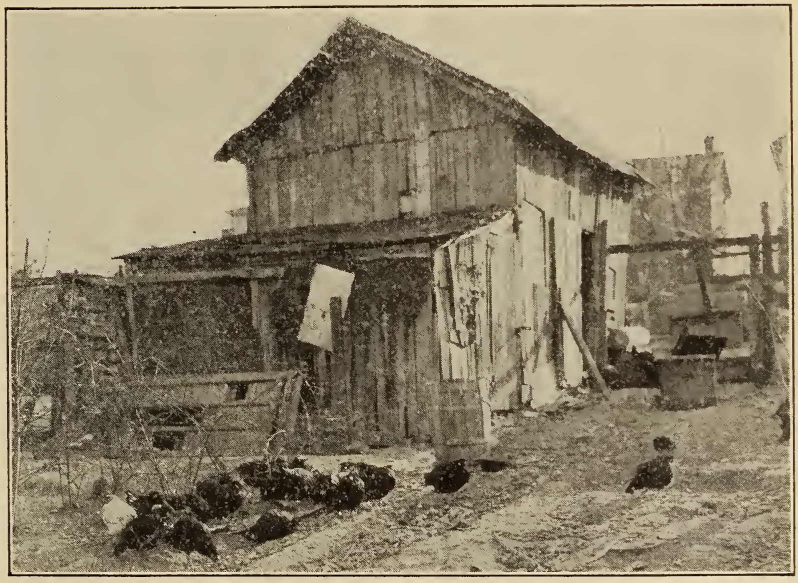

FIGURE 3.—Unclean premises such as these favor the development of tuberculosis in poultry.

The principal means of transmitting avian tuberculosis to swine is by allowing tuberculous poultry to mingle with swine in the same hog lot or pasture. (See title page.) This practice usually results in the contamination of the hogs' feed and water with infected droppings. As previously stated, hogs may also acquire the disease by eating carcasses of tuberculous fowls. Poultry should, therefore, be kept out of the hog lot. Avian tuberculosis is rarely transmitted from one hog to another.

Symptoms of the Disease

Tuberculosis in poultry develops slowly in most instances. The majority of extensively infected cases occur, therefore, in fowls that are more than 1 year old. However, the disease sometimes occurs in poultry only a few months old, especially when they are raised in yards that are badly contaminated by the germs. Common symptoms of tuberculosis in poultry are ravenous appetite—although the bird derives little benefit from the feed—and general emaciation, with wasting of the flesh on the breastbone (fig. 4). In advanced cases this wasting of the flesh continues until only the skin and bone appear to be left. This condition can be detected readily by feeling the breast-

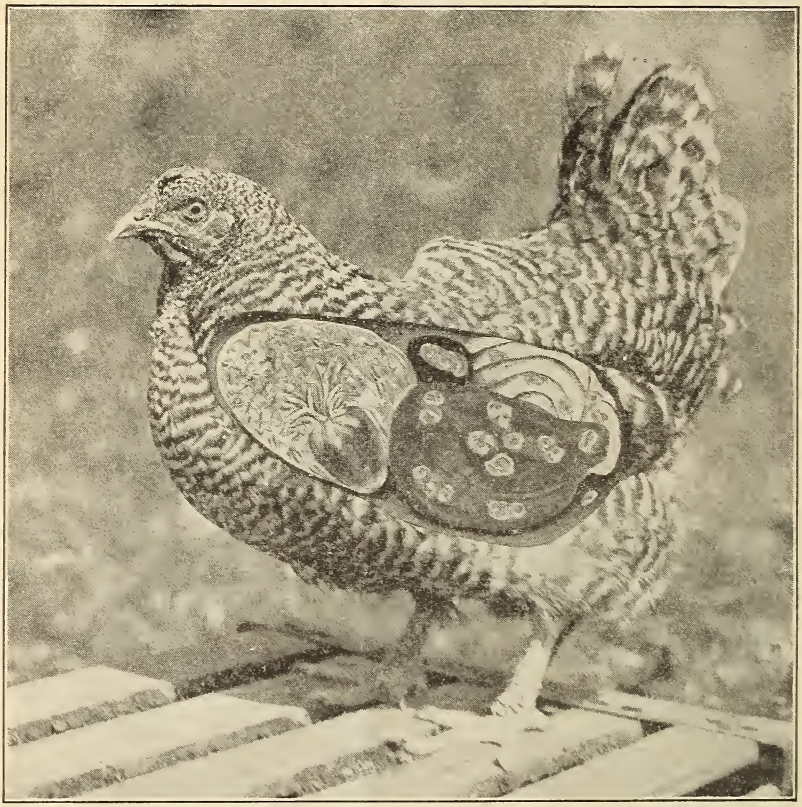

FIGURE 4.—A hen showing general symptoms of tuberculosis. Note ruffled feathers, swelling of the joints of the feet, and general weakness. The cutaway view indicates the common location of tuberculous spots or lesions in the liver, spleen, and intestines. Note also the greatly enlarged liver.

bone with the fingers. In the last stages of the disease a mature hen may weigh only about 1 pound. Other common symptoms are pale comb and wattles, swollen joints, and diarrhea. The eyes usually remain bright. Very often the first symptom to be noticed is lameness in the left leg, although both legs may be affected.

Although some of these symptoms are usually noticeable in diseased fowls, there have been cases of tuberculosis in carefully culled and seemingly healthy flocks. Avian tuberculosis is a very insidious disease which can be kept out of a flock only by constant vigilance, especially by disposing of old hens, as described later.

Avian tuberculosis seldom produces characteristic symptoms in swine. It is necessary, therefore, to resort to the tuberculin test to detect the disease in valuable breeding stock or animals purchased for stocking or restocking purposes.

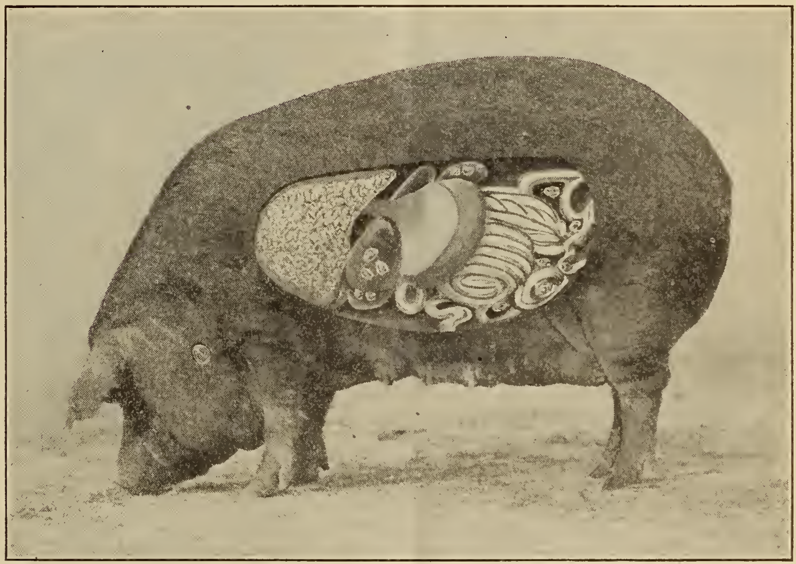

FIGURE 5.—A cutaway view of a hog showing tuberculous lesions in the lymph glands of the neck and of the intestines.

Post-Mortem Appearance

In poultry, tuberculosis produces in the internal organs grayish white or yellowish tumors of various sizes, which in a short time become hard and gritty. The liver and spleen of the fowl are usually the most extensively affected, with yellowish spots of varying sizes; the liver is generally greatly enlarged, often occupying about half the body cavity (fig. 4). The intestines are frequently covered with tuberculous tumors ranging in size from that of a small grain of sand to that of a hazelnut. These tumors have outlets that lead into the intestinal tract. In a badly diseased fowl, millions of the germs are passed off with the droppings. As a general rule the lungs are not extensively affected. In this respect the disease differs from the type that affects cattle, in which the lungs are among the first organs to be affected.

The avian type of tuberculosis in swine usually produces localized lesions frequently affecting only the lymph glands of the neck and of the intestines (fig. 5). These lesions produce grayish-white or yellowish spots or nodules, which after a few months become partly calcified and have a gritty texture when cut. Generalized cases of tuberculosis, however, may, in rare instances, be caused by the avian type of germ when great numbers are taken into the system. In such cases the lungs and other organs may be affected so seriously that the disease cannot be distinguished from infection caused by the bovine type of tuberculosis, except by laboratory examination.

Application of the Tuberculin Test

Diagnosing tuberculosis in living fowls that show no outward symptoms is possible by means of the intradermic tuberculin test. This test is made by injecting a small quantity of tuberculin into the skin of the wattle of the fowl (fig. 6) or into the skin of the vent. A swelling at the point of injection at the end of 48 hours indicates the presence of tuberculosis (fig. 7). The testing of all the poultry in a community is impracticable, however, because of the cost. A better plan is for the veterinarian who inspects the flocks to test a few of the old hens on premises where no symptoms of the disease are found. It is also a good practice to test purebred breeding flocks or high producers when there is reason to suspect tuberculosis, as the value of such fowls usually justifies the cost of the test.

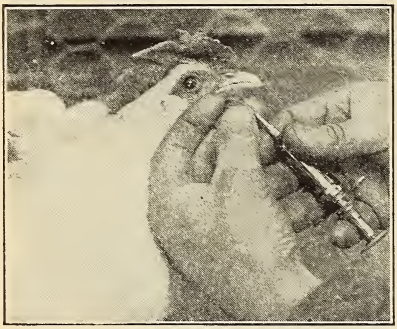

FIGURE 6.—Applying the tuberculin test to a fowl. Although testing of commercial flocks is not commonly practiced owing to the cost, it is advisable that purebred breeding stock be tested so that tuberculosis, if present, may be detected and eradicated.

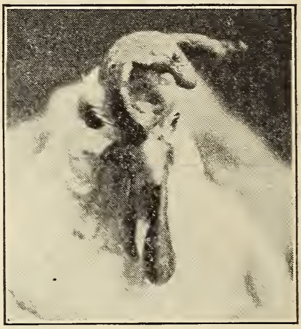

FIGURE 7.—Hen showing reaction to the tuberculin test. Note swollen left wattle (at the right) into which the tuberculin had been injected 48 hours previously.

The same general principle applies to herds of swine. In case it is desirable to apply the tuberculin test to breeding stock that have been running with tuberculous poultry, tuberculin made from the avian strain of the germ should be used. The tuberculin is usually injected into the skin of the ear, although in sows the tuberculin may be introduced into the skin of the vulva. As the application of the tuberculin test to either swine or poultry requires a great deal of skill it is advisable to obtain the services of a qualified veterinarian.

Combating the Disease in Poultry

Disposing of Diseased Birds

No treatment is effective for tuberculosis in poultry or other livestock. In adopting a plan for the eradication of tuberculosis in poultry the flock, instead of the individual bird, should be considered as a unit, differing in this respect from the plan followed in the eradication of tuberculosis from cattle. The best method of eradicating infection from a diseased flock is to slaughter all the birds in the summer at the close of their laying year. Birds showing no outward symptoms of tuberculosis may be marketed, and those having only slight lesions on internal organs may be used as food. The affected organs, of course, should be discarded. Badly diseased birds should be completely burned or else buried deeply so as to insure protection to healthy birds and swine.

Disinfection

Poultry houses and all utensils used by tuberculous birds should be thoroughly cleaned and washed, preferably with hot lye solution, then with a strong solution of a germicide such as carbolic acid, compound solution of cresol, sodium orthophenylphenate, or any of the recognized coal-tar preparations or dips. Carbolic acid may be used in a 5-percent solution, compound solution of cresol in 3-percent solution, and sodium orthophenylphenate in a solution of 1 pound to 12 gallons of water at a temperature of 60° F. or higher.

Before the disinfection of houses, equipment, and yards, the premises should be thoroughly cleaned. The liquids should be sprayed or otherwise applied in a thorough manner, so that the area to be disinfected is well soaked. Merely sprinkling the germicide here and there is of little value. After disinfection the house, if portable, should be moved to clean ground.

Where the foregoing plan is not practicable, the premises used by the diseased flock should be kept free of fowls for at least 1 year, and preferably 2 years, so that any germs will die. The sun's rays will destroy tuberculosis organisms in a short time when they are left exposed, and by this means fields and yards are disinfected to a large extent. Dark or covered places not reached by the direct rays of the sun are likely to harbor the germs of tuberculosis for a long time. All loose material that shades the ground, therefore, should be removed, and there is added safety in applying a disinfectant to areas under buildings or other dark or shaded places.

Restocking Clean Premises

After disposing of diseased birds and disinfecting the premises, a new flock may be established. If the new flock is started with chicks, either hatched on the farm or purchased, a brooder, rather than hens, should be used in raising them. This procedure safeguards the young chicks from possible infection.

In restocking the farm, the owner should make a special effort to obtain eggs, chicks, or fowls from flocks in which there has been no evidence of an infectious disease for at least a year. It is a good plan to quarantine new fowls for about 2 weeks in order to allow time for the development of symptoms of any of the more acute diseases which may be carried.

Sanitation

The health and production of a flock of chickens are greatly influenced by housing conditions and sanitation. The house should be located on sunny, well-drained ground preferably in a location that provides ample range for the fowls. At least there should be sufficient space adjoining the house to permit the use of two runways arranged so that they may be alternated several times a year. There are many practical types of houses, and the poultry raiser should select one to suit his particular region. The United States Department of Agriculture and the State colleges of agriculture publish bulletins on this subject. All poultry houses should have 2-inch mesh poultry netting tacked on the underside of the roosts to keep the fowls away from droppings. This is an important sanitary precaution in the prevention of tuberculosis and other poultry diseases.

It is important also that equipment be provided that will protect the feed and water from contamination by droppings. A good practice is to place this equipment on a raised framework covered with ½-inch-mesh wire netting. All low spots in the yard that hold water should be filled or drained, as many kinds of germs may live in such places for a long time.

Disposal of Old Hens

A practical means of preventing tuberculosis from becoming troublesome in poultry flocks is the disposal of old hens. As the disease generally develops slowly, an affected fowl seldom becomes a menace to others in the flock until about 16 months old or more. At that age a hen has finished her first laying year and if she has been fed properly should be in good condition for slaughter. If the flock is replaced with pullets raised from clean stock, the premises will be constantly restocked with disease-free birds. The sale of hens will pay a considerable part of the cost of raising the pullets, and the owner will avoid having to carry a flock of hens through the molting season of late summer and early fall.

Increased egg production and the likelihood that there will be less tuberculosis among the pullets will largely offset the loss in disposing of the yearling hens. This practice constitutes an efficient method of preventing the disease and thus avoids the more expensive procedure of eliminating infection from badly infected flocks and premises.

The practice of disposing of old hens is desirable also for other reasons. It takes approximately two thirds as much feed to carry a hen through the molting period as it does to raise a pullet to laying age. The egg production of a flock of pullets is usually from a fourth to a third greater than that of yearling hens of similar breeding, and the pullets lay more of their eggs during the fall and winter when egg prices are higher. According to reports from agricultural extension specialists, the average production per hen in flocks in home egg-laying contests was 129 eggs, or nearly 11 dozen. The pullets in the same contest averaged 165 eggs, or nearly 14 dozen. This was a difference of 3 dozen eggs per bird in favor of the pullets.

Combating the Disease in Swine

The eradication and prevention of avian tuberculosis in the poultry flock guards the health of swine on the same farm. Swine are commonly marketed when less than a year old. Up to that age they rarely transmit the disease to one another. Hence in market hogs that are sent to slaughter at the usual ages no procedure except maintenance of sanitary conditions need to be taken. In the case of breeding stock, as previously stated, the tuberculin test should be used to disclose affected animals, which should be promptly removed from the herd and slaughtered, preferably under official inspection.

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